United States Court of Appeals

for the

District of Columbia Circuit

TRANSCRIPT OF RECORD

In the

United States Court of Appeals For the District of Columbia

Appeal No. 10,651.

THE SHERWIN-WILLIAMS COMPANY,
GRADY M. O'NEAL,
Appellants,

vs.

JOHN A. MARZALL,
Commissioner of Patents,
Appellees.

United States Court of
For the
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Appeal From the Judgment of the United States District Court for the District of Columbia,
Civil No. 3821-47.

BRIEF OF APPELLANTS
and
APPENDIX.

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QUESTIONS ON APPEAL.

1. Is the discovery of a new chemical process producing greater yields of a desired product with greater economy and safety than prior art processes within the expected skill of the art when

(a) the basic reference excludes the key ingredient of the new process from the listed practical ingredients,

(b) literature amplifying indefinite auxiliary references lists the said key ingredient of the new process among the less satisfactory ingredients for producing the desired product, and

(c) standard chemical tables and literature suggest that an explosion would result from the reaction of said key ingredient and the ingredients common to the new process and the basic reference.

2. To anticipate a claim in a pending patent application by combining the disclosure of a basic patent reference (issued on an earlier filed but copending application) with auxiliary references, is it within the doctrine of *Minnesota Mining & Mfg. Co. v. Coe,* 67 Apps. D. C. 256 to disregard statements in the basic reference inconsistent with the combination of the basic and auxiliary references.

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BRIEF OF APPELLANTS.

JURISDICTIONAL STATEMENT.

This is an appeal from the final decision of the United States District Court for District of Columbia dismissing, without opinion, the suit, Civil Action No. 3821-47, brought by plaintiffs against defendant under 35 United States Code 63 (R. S. 4915). Said suit was for the issuance of a patent upon the application of appellant, Grady M. O'Neal, Serial No. 479500, filed March 17, 1943. Jurisdiction of this Court to review said final decision is vested by Title 28, United States Code, sections 1291 and 1294 (1).

THE O'NEAL INVENTION AND THE PRIOR ART.

The history of the art.

The invention of the O'Neal application in suit relates to a process for producing copper phthalocyanine blue dyestuffs. A relatively detailed discussion of the process, as such, is fairly set forth in the Finding of Fact 2. What that finding of fact does not reveal is that copper phthalocyanine is the "Cadillac" of blue dyestuffs, that is, its properties of color strength, stability, and other desirable characteristics greatly exceed those of other blue dyestuffs. In fact, the discovery of the pigmentary properties of copper phthalocyanine, in 1928, ranks as one of the greatest discoveries in the whole art of dye chemistry. But the use of the excellent dyestuff has heretofore been limited and offset by its relatively great cost and difficulties of production. The early processes required expensive equipment and reacted violently with great danger to workmen; the yields of dyestuff were also very low. (See O'Neal testimony, Appendix, page 15a.)

The spread between the great advantages of copper phthalocyanine dyestuff, on the one hand, and uneconomical factors limiting its production and use, on the other, is precisely the sort of inducement which would be expected to lead to intensive research in finding improved processes for making the dyestuff. This was actually the case; prior to the effective filing date of O'Neal in 1941, intensive research had been carried on for nearly fifteen years not only by the chemical giants of this country but by great dyestuff concerns of Europe and England (where it was discovered). (O'Neal testimony, Appendix, pages 12a-13a; 15a-16a.)

In short, the present invention was made in a field where, characteristically, chemists of the highest caliber are engaged and after such chemists had the opportunity to thoroughly explore the field. And it is respectfully submitted that an adjudication of whether or not O'Neal's discovery amounted to patentable invention must be viewed in the perspective, namely, that the key ingredient of O'Neal's process had been tested and found wanting by highly skilled chemists.

Comparison of O'Neal and Lacey Processes.

The basic reference relied upon by the appellee in opposing the grant of a patent to O'Neal is the Lacey Patent No. 2,302,612, granted after O'Neal's effective filing date. Just as Finding of Facts discloses the O'Neal process in fairly accurate detail, so Finding of Fact 4 discloses the Lacey process in nearly* accurate detail. Superficially, O'Neal's and Lacey's process may seem similar. O'Neal reacts ortho-dinitrile and copper acetate in nitro-benzene saturated with ammonia gas; Lacey uses the same ingredients except that, instead of copper acetate, Lacey uses cupric (not cuprous) chloride. This comparison, as found in Finding of Fact 9, ignores the vast difference in yields (50% for Lacey, over 90% for O'Neal), optimum operation temperature (180-220°C for Lacey, 135°C for O'Neal) and the probably completely different types of chemical reactions involved.

APPEAL QUESTION NO. 1.

Yet even with the above superficial comparison, Finding of Fact 9 is not supported by the evidence. Finding of Fact 9 (actually a mixed finding of law and fact) holds that "it would be within the expected skill of the art, and hence lacking invention," for O'Neal to substitute copper acetate for the cupric chloride used by Lacey. To support such a finding, evidence presented must be ignored, as follows:

(a) As stated in Finding 4, at the very outset of the Lacey disclosure Lacey states that, of the various copper-bearing compounds used in making copper phthalocyanine,

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* Finding of Fact 4 states that the Lacey process operates as low as 100°C; this applies only when the Lacey process is modified by "boosters" having no place in the O'Neal process. Example 1 of the Lacey patent shows that when used without boosters, Lacey's process only commences to operate at 150-160°C, and is carried out at 210°C, far above O'Neal's optimum temperature of 135°C.

> "In the practical processes only two classes of copper containing compounds have been used, namely metallic copper itself and copper halides."

Since Lacey himself uses only copper halides (e.g. cupric chloride, cupric bromide) and since O'Neal's copper acetate is neither metallic copper nor a copper halide, *the basic reference excludes O'Neal's key ingredient and the substitution of O'Neal's ingredient.*

(b) Disregarding the teaching at the outset of Lacey, the appellee took the United States and British Patents to Heilbron, et al., the United States patent to Wyler, and the French patent to I. G. Farbenindustrie, cited in Finding 9 for showings of copper acetate as an alternative for cupric chloride. Under the rule of this Court in *Baldwin-Southwark v. Coe,* 76 Apps. D. C. 412, mere suggested alternative in foreign patents is not anticipating disclosure and the foreign patents relied upon may be disregarded.

But in listing copper acetate as a substitute for cupric chloride, the auxiliary references, *which relate to different types of processes,* do not say how good a substitute the copper acetate may be. Is copper acetate, catalogued in these references along with the copper oxides, copper sulphite, and copper sulphate, a satisfactory or unsatisfactory substitute for copper chloride? Since the patent references do not teach those skilled in the art the relative satisfactoriness of copper acetate and copper chloride, one must turn to other literature. If this is done, the article by Lindstead and Dent, *Journal of the Chemical Society*—1934, reveals the answer. Bearing in mind that Lindstead and Dent were associates of Heilbron and Wyler at Imperial Chemical Industries, the article as cited in Finding 4 reveals that

> "None of these substitutes [the copper oxides, acetate, sulphite, sulphate] was as satisfactory in practice as were the metal or the chlorides."

In short, when amplified by literature written by associates of the patentees of the auxiliary references, the auxiliary references amount to no more than statements out of context, in so far as expectations of those skilled in the art is concerned. In processes to which the auxiliary references relate, the art expected that copper acetate would be impractical and inferior to copper chloride, *the same as the patentee of the basic reference, Lacey, expected.* And what, in the basic reference or the auxiliary references, would lead one to select copper acetate from the various unsatisfactory substitutes for cupric chloride in the prior art processes and expect to get greatly superior results?

(c) Just as lifting of copper acetate out of the listing of substitutes for cupric chloride is, in effect, lifting a statement out of context in so far as the knowledge of the art with respect to the processes of the auxiliary references is concerned, so is it also a lifting out of context in so far as the prior art told those skilled in it what they might expect in a reaction involving the ingredients of the O'Neal process.

As pointed out in O'Neal's testimony [Appendix pages 18a to 20a] O'Neal undertook his first experiments with his process with considerable fear and misgiving and with substantial precaution against injury because (despite his own theory how his process might work), the International Critical Tables, "Unit Processes in Organic Synthesis," and other literature suggested the strong possibility of an explosion occurring when he reacted the ingredients of his process, a likelihood because of the unique property of copper acetate in catalyzing an oxidation reaction which initiates an explosion or detonation. In the face of such evidence, what would lead one skilled in the art to expect that O'Neal's reaction would be "as smooth as stirring sugar into coffee"?

SECOND QUESTION OF APPEAL.

All of the foregoing treats the Lacey patent as an unquestioned reference, that is, as though it were issued more than a year prior to O'Neal's effective filing date, rather than after O'Neal had filed an application for his invention without any opportunity to have acquired knowledge of Lacey's invention. Although Lacey is not statutorily authorized to be cited as a reference, appellee contends that it must be construed as a reference under *Minnesota Mining & Mfg. Co. v. Coe,* 67 Apps. D. C. 256.

If the Lacey patent did not exclude O'Neal's key ingredient from the group of satisfactory cuperiferous materials, that is, if Lacey had not volunteered to point out what he (and the prior art) understood to be the only practical classes of cuperiferous materials for making copper phthalocyanine, appellants would not question appellee's application of the doctrine of the *Minnesota* case.

As appellants understand the doctrine of the *Minnesota* case, it is derived from *Alexander Milburn Co. v. Davis-Bournonville Co.,* 270 U. S. 390 and permits the Patent Office to reject a later filed application on an earlier filed copending application where the later-filed application *claims* an invention disclosed in the earlier filed application and, if what is claimed in the later application differs by mere equivalency, then the earlier filed application may be combined with other references to anticipate the claim of the later application. But appellants cannot find authorization in that case for rejecting a later filed application where there is no inconsistency between the knowledge disclosed by the earlier application and the claims of the later. As this Court stated:

> "It is disclosure of knowledge inconsistent with a later claim of first invention which is important in determining the effect of co-pending applications. * * * Prior knowledge, *clearly revealed,* is repugnant to the claim of first invention. This is the meaning of the

> decision in the Milburn Co. case." (67 Apps. D. C. 259, emphasis supplied.)

In the instant case, there is no inconsistency between appellant O'Neal's claim of first invention and what was known by Lacey. Instead of *clearly revealing* what appellants claim, Lacey clearly shows at the outset of his disclosure that he excluded applicant's key ingredient as practical, by concluding, as the prior art taught him, that only copper halides or copper could be practical. Nothing in Lacey shows that he had any concept that the use of copper acetate with the non-cuperiferous ingredients of his process would effect a process having greater yields at lower optimum temperatures and consequent greater safety and economy.

It is well established with respect to references published prior to the filing of an application that statements in a reference are not ignored to thereby render the reference anticipatory. *In re Jayne, et al.* (CCPA), 129 F. (2d) 692. Nor is a combination of references proper if the combination is suggested only by the applicant and not by the references. *Ex parte Myerson,* 72 U. S. P. Q. 49; *Ex parte Gary,* 76 U. S. P. Q. 224. It is not understood that the *Minnesota* case was intended to permit an earlier filed application to have a greater anticipatory effect than could be ascribed to a statutory reference.

CONCLUSION.

It seems clear that without Lacey as a reference, appellee's grounds for refusing appellants a patent must fail. O'Neal and Lacey acted independently of each other. Lacey, following the prior art as to the use of the apparently most practical cuperiferous material, obtained a process for which he received a patent. O'Neal achieved all that Lacey did in developing non-cuperiferous ingredients and, instead of following the prior art as to the selection of cuperiferous materials, discovered that a cuperiferous material regarded as relatively worthless by the prior art, *in different processes,* happened to produce remarkable results. It seems anomalous that the one who achieved greater success, and without assistance from the other, should be the one to whom a patent is denied. It is respectfully submitted therefore, that the District Court erred and should be reversed.

Respectfully submitted,

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APPENDIX.

COMPLAINT FOR ISSUANCE OF A PATENT.

(Filed September 22, 1947.)

(Action under Section 4915 R. S.
35 U. S. C. Sec. 63.)

Plaintiffs herein for their complaint allege:

1.

Plaintiff The Sherwin Williams Co. is a corporation organized and existing under the laws of the State of Ohio and has an office and place of business in the City of Cleveland, Cuyahoga County, Ohio, and is the Assignee by assignment of Plaintiff Grady M. O'Neal of the application for patent involved herein. Plaintiff Grady M. O'Neal is a citizen of the United States and a resident of Chicago, Cook County, Illinois.

2.

That defendant, Lawrence C. Kingsland, is Commissioner of Patents of the United States, is a citizen of the United States, and has his official residence as Commissioner of Patents in the District of Columbia, and is named as defendant in this Complaint in his official capacity as Commissioner of Patents of the United States.

3.

That this is a suit brought under the patent laws of the United States, and more particularly under and pursuant to the provisions of Section 4915, R. S. of the United States, 35 U. S. C. Sec. 63, as amended.

4.

That heretofore, to wit, on March 17, 1943, plaintiff Grady M. O'Neal was the true, original and first inventor of certain new and useful improvements in "Manufacture of Copper Phthalocyanine Colors,'' not known or used by others in this country before his invention or discovery thereof and not patented or described in any printed publication in this or any foreign country and not in public use or on sale in this country prior to his invention or discovery thereof or for more than one year prior to his application for Letters Patent therefor, and for which invention no application for Letters Patent had been filed by him or his legal representatives or assigns in any foreign country more than twelve months prior to his application for Letters Patent of the United States, and which invention had not and has not been abandoned.

5.

That being, as stated, the original, first and sole inventor of said improvements and entitled to a patent therefor, the said plaintiff Grady M. O'Neal on or about the 17th day of March 1943, duly filed in the United States Patent Office an application for Letters Patent on said invention, Serial No. 479,500, a continuation-in-part of a similarly entitled application, filed February 15, 1941, Serial No. 379,045, said application complying in all respects with the requirements of the law in such cases made and provided.

6.

That the Primary Examiner of the United States Patent Office, to whom said application was assigned, finally refused allowance of the following claims in said application:

> 1. The process of forming a copper phthalocyanine type of dyestuff which comprises reacting in a liquid vehicle of nitrobenzene saturated with ammonia gas four moles of cyclic ortho-dinitrile and a quantity of a reaction product of ammonia with a cupriferous agent selected from the group consisting of solid hydrated and solid anhydrous cupric acetate to provide

at least a corresponding atom equivalent of copper, at a temperature in the range from 115° C. to the reflux temperature at normal atmospheric pressure, and separating the resulting dyestuff from nitrobenzene.

2. The process of forming a copper phthalocyanine type of dyestuff which comprises reacting in a liquid vehicle of nitrobenzene saturated with ammonia gas four moles of phthalonitrile and a quantity of a reaction product of ammonia with a cupriferous agent selected from the group consisting of solid hydrated and solid anhydrous cupric acetate to provide at least a corresponding atom equivalent of copper, at a temperature in the range from 115° C. to the reflux temperature at normal atmospheric pressure, and separating the resulting dyestuff from nitrobenzene.

5. The process of forming a copper phthalocyanine type of dyestuff which comprises reacting in a liquid vehicle of nitrobenzene saturated with ammonia gas four moles of cyclic ortho-dinitrile and a quantity of a reaction product of ammonia with a cupriferous agent selected from the group consisting of solid hydrated and solid anhydrous cupric acetate to provide at least a corresponding atom equivalent of copper, at a temperature in the range from 130° C. to the reflux temperature at normal atmospheric pressure, and separating the resulting dyestuff from nitrobenzene.

6. The process of forming a copper phthalocyanine type of dyestuff which comprises reacting in a liquid vehicle of nitrobenzene saturated with ammonia gas four moles of phthalonitrile and a quantity of a reaction product of ammonia with a cupriferous agent selected from the group consisting of solid hydrated and solid anhydrous cupric acetate to provide at least a corresponding atom equivalent to copper, at a temperature in the range from 130° C. to the reflux temperature at normal atmospheric pressure, and separating the resulting dyestuff from nitrobenzene.

9. The process of forming a copper phthalocyanine type of dyestuff which comprises reacting in a liquid vehicle of nitrobenzene saturated with ammonia gas four moles of phthalonitrile compound and a quantity of a reaction product of ammonia with a cuprif-

erous agent selected from the group consisting of solid hydrated and solid anhydrous cupric acetate to provide at least a corresponding atom equivalent of copper, at a temperature in the range from 130° C. to 135° C., and separating the resulting dyestuff from nitrobenzene.

13. The method of producing a copper phthalocyanine type of dyestuff which comprises reacting cyclic ortho-dinitrile with a reaction product of ammonia with a cupriferous agent selected from the group consisting of solid hydrated and solid anhydrous cupric acetate at a reaction temperature of at least 100° C. in a liquid vehicle of nitrobenzene and in the presence of sufficient ammonia gas to saturate the said liquid vehicle with ammonia.

14. The method of producing a copper phthalocyanine type of dyestuff which comprises reacting phthalonitrile with a reaction product of ammonia with a cupriferous agent selected from the group consisting of solid hydrated and solid anhydrous cupric acetate at a reaction temperature of at least 100° C. in a liquid vehicle of nitrobenzene and in the presence of sufficient ammonia gas to saturate the said liquid vehicle with ammonia.

17. The method of producing a copper phthalocyanine type of dyestuff which comprises reacting phthalonitrile with a reaction product of anhydrous ammonia with anhydrous cupric acetate at a temperature from 130° C. to 135° C. in a liquid vehicle of nitrobenzene and in the presence of sufficient substantially anhydrous ammonia to saturate the said vehicle with ammonia.

20. The process of forming a copper phthalocyanine dyestuff consisting of the steps of reacting cupric acetate and ammonia gas to form a copper amino complex acetate salt and then reacting said copper amino complex with cyclic o-dinitrile in a vehicle comprised of nitrobenzene saturated with anhydrous ammonia, maintaining said reactants and vehicle at a temperature in excess of 100° C. during the reaction, and passing anhydrous ammonia through the vehicle through-

out the reaction period to maintain the saturation thereof with ammonia.

21. The process as defined in claim 18 in which the process is carried out under anhydrous conditions with anhydrous reagents and in which the temperature of the reaction between the copper amino complex acetate salt and the cyclic o-dinitrile is substantially completely carried out at a temperature ranging between 130-135° C.

22. The process comprising the steps of dispersing cupric acetate and cyclic o-dinitrile in nitrobenzene saturated with ammonia gas, maintaining the dispersion between 100° C. and the reflux temperature of the nitrobenzene to form a copper phthalocyanine dyestuff, and maintaining the saturation of the nitrobenzene with ammonia.

7.

That in due time and in compliance with the laws and regulations in such cases made and provided, an appeal was taken from said final rejection to the Board of Appeals of the United States Patent Office, and the said Board of Appeals, after hearing the said appeal, as the plaintiffs submit, incorrectly and contrary to the law and the facts submitted to said Board of Appeals, affirmed the final rejection made by the Primary Examiner, and refused a patent upon the said application, as from duly authenticated copies of said application and of the aforesaid proceedings in the Patent Office will more fully and at large appear.

8.

Plaintiffs further state that no appeal has been taken from said decisions of the Board of Appeals to the Court of Customs and Patent Appeals, Washington, D. C., or to any other higher tribunal, and no such appeal is pending or has been decided, and this bill is filed within the six months' period following the decision of the Board of Appeals of July 14, 1947, as required by law.

WHEREFORE, plaintiffs bring this suit under and in accordance with the provisions of the statute made and provided in such cases, and pray this Honorable Court:

1. To decree that plaintiff, GRADY M. O'NEAL, is the true, first, and sole inventor of the improvements described in said application and defined in said claims 1, 2, 5, 6, 9, 13, 17, 20, 21 and 22, inclusive, aforesaid, and each of them, and that plaintiff, The Sherwin Williams Co., is entitled to receive Letters Patent of the United States for such invention.

2. To authorize and direct the Commissioner of Patents to issue a patent on the claims aforesaid and each of them.

3. That summons addressed to the defendant, LAWRENCE C. KINGSLAND, issue out of this Court commanding him to appear and answer this complaint and to abide by and perform such order and decree as this Court may adjudge.

4. For such other, further, and alternate relief as equity may require.

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BACON & THOMAS,
By STEPHEN W. BLORE,
Attorneys for Service.

Proof of Service.

I hereby certify that on the 22nd day of September, 1947, a copy of the foregoing Complaint for Issuance of Patent has been served by mail upon the Commissioner of Patents, Washington 25, D. C.

BACON & THOMAS,
By STEPHEN W. BLORE.

ANSWER TO THE COMPLAINT.

(Filed October 27, 1947.)

To the Honorable the Justices of the District Court of the United States for the District of Columbia.

1, 2, 3. Defendant admits the allegations of paragraphs 1, 2 and 3.

4. He admits that on March 17, 1943, plaintiff Grady M. O'Neal, claiming to be true, original and first inventor of certain alleged new and useful improvements in "Manufacture of Copper Phthalocyanine Colors," filed in the Patent Office an application for patent thereon, to which application Serial No. 479,500 was given, and in said application made averments corresponding to the allegations of paragraph 4. He denies, for reasons hereinafter given, that said allegations are sufficient to justify the issuance of a patent on said application.

5. He admits that said application was filed on March 17, 1943, and was given Serial No. 479,500, and that said application was filed as a continuation in part of a similarly entitled application filed on February 15, 1941, Serial No. 379,045. He admits that said application No. 479,500 was in compliance with the formal requirements of law.

6. He admits that the primary examiner finally refused the allowance of claims 1, 2, 5, 6, 9, 13, 14, 17, 20, 21 and 22 of said application. He admits that the said claims are as set out in paragraph 6, except that in claim 1, line 6, the word "and" should be *with*, and that in claim 20, lines 4 and 5, the word "amino" should be *ammino*, and that in claim 21, line 5, the word "amino" should be *ammino*, and that in claim 21, line 1, the number "18" should be *20*.

7. He admits that in due time and in compliance with law plaintiffs appealed to the Board of Appeals of the Patent Office from the final rejection by the examiner of said claims and that said Board, after hearing said appeal, affirmed the said rejection and refused a patent on said

application containing any of said claims. He denies that the action of the Board of Appeals was incorrect or contrary to law and the facts. He states that the said claims are unpatentable in view of the following prior patents and for the reasons given in the statement of the examiner in answer to the appeal and the decision of the Board of Appeals, copies of which will be furnished at the trial:

Heilbron et al.,	2,166,213,	July 18, 1939,
Wyler,	2,216,867,	Oct. 8, 1940,
Lacey,	2,302,612,	Nov. 17, 1942,
British Patent,	410,814,	May 16, 1934,
French Patent,	799,901,	Apr. 20, 1936.

Profert of copies of these patents is hereby made.

8. He admits the allegations of paragraph 8.

W. W. Cochran,
Solicitor, U. S. Patent Office,
Attorney for Defendant.

October 27, 1947.

I hereby certify that a copy of this Answer to the Complaint was mailed today, October 27, 1947, to the attorney for Plaintiffs, Messrs. Bacon & Thomas, 540 Shoreham Building, Washington 5, D. C.

W. W. Cochran,
Solicitor.

TESTIMONY OF GRADY M. O'NEAL.

Grady M. O'Neal was called as a witness by and on behalf of the plaintiffs and, first having been duly sworn, was examined and testified as follows:

Mr. Ely: Your Honor, Mr. O'Neal, a number of the questions that I ask him will require reference citations from prior literature. I just want to explain these notes that Mr. O'Neal has here.

Direct Examination by Mr. Ely.

Q. State your name, please. A. Grady M. O'Neal.

Q. And your age. A. Thirty-five, August 30, 1948.

Q. And your address. A. Apartment 211, 5465 South Everett Avenue, Chicago 15, Illinois.

Q. What is your occupation? A. Chemist.

Q. What degree do you hold? A. B. S. Mississippi State College, 1935.

Q. Since your graduation where have you been employed? A. The Sherwin-Williams Company.

Q. What branch or plant of the Sherwin-Williams Company? A. The Sherwin-Williams plant, 115th Street and Cottage Grove Avenue, Chicago 28, Illinois.

Q. How soon after graduation were you employed there? A. Immediately afterwards.

Q. What was your first position with the Sherwin-Williams Company? A. Development and production chemist for tannated methyl violet ink production.

Q. What is your present position? A. Director, Organic Research Laboratory.

Q. You have been in research continuously since you have been employed by the Sherwin-Williams Company? A. Yes, in varying degrees, depending upon the exigencies of the moment.

Q. What has been the principal field of your research with the Sherwin-Williams Company? A. It has been rather variegated, development of new products and processes for organic pigment dyestuffs, dye intermediates and organic synthesis generally.

Q. In the course of your research work have you personally invented any new pigments and dyestuffs and processes for making them? A. Yes, a number.

Q. About how many patents have been granted to you? A. In this field, approximately ten. My latest patent is U. S. 2,410,301, it involves the "Manufacture of Copper Phthalocyanine Dyestuffs."

Q. You are the inventor of and the applicant named in the application in suit here? A. Yes.

Q. Did the invention of the application in suit have anything to do with the invention of your most recently granted patent? A. No, they are entirely different processes.

Q. Processes of making the same dyestuffs? A. That is right, exactly.

Mr. Ely: Your Honor, I have a certified copy of the O'Neal application in suit, Serial No. 479,500.

Mr. Moore: Does that include the parent case?

Mr. Ely: No, sir, it does not include the parent case. there was an earlier case.

The Court: Very well.

(The document referred to was received in evidence and marked Plaintiff's Exhibit No. 1.)

By Mr. Ely:

Q. On the first page of the appeal brief is a rather complex structural formula, formula, is that approximately the formula of copper phthalocyanine? A. Yes, it is.

The Court: How many claims?

Mr. Moore: Eleven claims, I think are here.

Mr. Ely: Yes, there has always been about eleven or so.

Mr. Moore: How many claims in the original?

The Court: Yes.

Mr. Moore: The original file indicates nineteen, and then he added on three more here.

Mr. Ely: Nineteen filed.

The Court: Twenty-two filed.

Mr. Moore: Twenty-two filed.

The Court: Twenty-two filed, what happened to those, 1, 2, 5, 6, 9, 13, 14, 17 and 20 through 22 were rejected.

Mr. Ely: We cancelled those, Your Honor, and subsequently redrew the claims and reduced the number of claims to try to clarify the invention as set forth in this particular case.

The Court: Well, then, the filed claims are only 1, 2, 5, 6, 9, 10, 13, 14, 17, 20, 21 and 22—11. What happened to the others?

Mr. Ely: They were cancelled in the course of prosecution in the effort to try to substitute claims, Your Honor. By amending some of the claims which are now before the Court, we eliminated some which had been filed originally.

The Court: The only thing before me is the number of claims involved here?

Mr. Ely: Yes, sir.

By Mr. Ely:

Q. In your field, Mr. O'Neal, copper phthalocyanine is a relatively complex substance, is it not? A. Yes.

Q. Is it related to any other more commonly known organic substance? A. Yes, it is, chlorophyll and hemoglobin.

Q. Roughly, in what way is it related to these more commonly known organic substances? A. It is similar in chemical structure to chlorophyll, which is the green coloring matter in vegetation, and to hemoglobin, which is the red colored constituent of blood.

Q. How do they differ in structure from the structure of copper phthalocyanine? A. Well, to go into it rather comprehensively would be unduly lengthy. I might condense somewhat and say that in the case of chlorophyll you have very similar ingredients and an analogous molecule.

Also, in the case of chlorophyll we have a magnesium nucleus there.

Q. Whereas, in copper phthalocyanine you do not? A. That is right. You have copper there. Without going too much into the chemistry, in the case of hemoglobin you have a similar molecule, plus the fact that there is an iron nucleus present there.

The Court: You mean, it is similar in molecular structure but different in chemical constituents?

The Witness: Exactly.

Q. Will you please advise the Court briefly on the history of copper phthalocyanine and its importance to the industry and the public? A. Copper phthalocyanine was the result of an academic investigation by two Swiss chemists, de Diesbach and von der Weid, who made this discovery around 1926 and 1927. These two chemists did not know exactly what they had, and the publication of their investigation appeared about that time, but it lay dormant. Later, about the year 1928, Messrs. Scottish Dyes, Limited, at Grangemouth, Scotland, were manufacturing phthalimide by taking phthalic anhydride, and putting it in an iron reaction vessel and passing ammonia gas—

The Court: That is the process described by de Diesbach and von der Weid, in the Helvetical Chimica Acta publication?

The Witness: Yes, as far as the discovery of this dyestuff class is concerned.

Going back just a bit, the Scottish Dyes were attempting to make phthalimide by taking phthalic anhydride and putting it in an iron reaction vessel and passing in ammonia gases. This concern noticed, after a short time, that a very bright intensive blue colored material came out, and of course, being in the dyestuffs business they were naturally interested in this material. They took some of the material from the reaction mass and examined it, and it appeared to possess properties that were entirely unlike any other dyestuff. Of course, they were very interested, but they had no idea just what the chemical constitution of this material was, so they sent the material down to the Imperial Institute of Technology, an English university, for an elucidation of its chemical structure. After considerable work and effort they established that it was a metallo-organic compound, in short, iron phthalocyanine.

When they had the chemical structure established, naturally they were interested in possibly extending the then known range of dyestuffs, if they could, so they went into the investigation of the various metallo forms. After still more lengthy and laborious work they came to the finding that copper phthalocyanine was the most valuable and most practical of the phthalocyanine dyestuffs. Then they awoke to the unhappy conclusion that copper phthalocyanine, while it was a very valuable organic pigment, possessing unusual fastness to solvents and being extremely resistant to light, solvents, baking, washing, acids, alkalis and bleaches, the compound in itself was not new; and so, upon the completion of this study and work it was not found possible to patent the compound. Since that time, work in this field has resolved itself into trying to develop new derivatives of copper phthalocyanine and improving the manufacturing processes so that a better yield and cheaper manufacturing costs could be obtained.

Q. Is this excellent dyestuff now widely used? A. Yes, but not as widely as it could be, chiefly because of its expense. If I might use an analogy, it is somewhat like comparing a Cadillac with a Chevrolet. Everyone would like to use a Cadillac, but because of the Cadillac's expense, they use the Chevrolet. That is somewhat the analogy between copper phthalocyanine and the other existing blue dyestuffs.

Q. In other words, copper phthalocyanine is the Cadillac of the blue dyestuffs, is that right? A. In the vernacular, yes.

Q. I must refer again to our Exhibit I, the record in the Patent Office. There we cited Wolfe's "Printing and Litho Inks," which has a chapter on organic pigments. At page 133 of his text, attached as Exhibit A to our appeal before the Board of Appeals, Wolfe makes this statement:

> "The discovery of the phthalocyanine pigments constitutes the most important development of the dry color industry since Imerheiser's discovery in 1914 that the precipitation of basic dyestuffs by means of complex phosphotungstic and phosphomolydic acids yielded much faster pigments than could be obtained with the simple organic acids then being used."

Is that a correct statement in the literature of the relative importance of the discovery of copper phthalocyanine pigments?

The Court: Well, it is all supplemental to the testimony with respect to the importance of the subject.

Mr. Ely: Yes, sir.

By Mr. Ely:

Q. Referring to that publication, which I recall was published in about 1944, Wolfe treated the discovery of the phthalocyanine as being perhaps the most important discovery of the dry color industry since about 1914. In your experience, Mr. O'Neal, would you say that is a correct estimate of the importance of phthalocyanine? A. Well, it is probably an understatement.

Q. In other words, you think it ranks even higher than just the most important of the dyestuffs discovered say, in the last thirty years, is that right? A. I think that is correct, yes, because of the finding that the copper phthalocyanine dyestuffs would make very valuable derivatives.

Q. I would like to refer to another statement in Wolfe's—at the end of this article he says this:

> "As consumption is increased and the competition becomes keener, lower costs will be inevitable."

He is touching there on the fact that copper phthalocyanine was not so widely used because of its expense. In your opinion, is that last statement of Wolfe correct? A. No, I do not think it is exactly. You might almost say, sir, that it is the reverse of that situation. He has more or less put his cart before his horse there. I would say instead, that, if the costs were lower, then you would have greater competition and greater production or consumption of the dyestuffs.

Q. Will you outline briefly to the Court the reasons for the high cost of copper phthalocyanine produced according to the prior art methods? A. Well, the situation that exists is somewhat like this. In the normal processes existing up until my invention, the starting raw materials were quite expensive, and the reaction was violently exothermic and dangerous. As a result, only relatively small batches could be made because of the high temperature reaction. This meant that it took expensive equipment to manufacture this product. It was such a reaction that a lot of times you got a satisfactory dyestuff, and on other occasions your yields were very, very small. In a way, you might almost compare it with the case of the housewife, for instance, who, in attempting to make a cake, would have to use several times the amount of ingredients actually required in order to end up with about the desired size of cake. She would also have to use Pyrex or other expensive high temperature resistant containers and after putting in her ingredients, she may get only half of what she should reasonably expect, and then again, she may not get anything at all. That, roughly, is the reason why the material was so expensive.

Q. Will you mention to the Court some of the more recent companies that have been interested in the problem, during the last say twenty years or so, of producing copper phthalocyanine, and particularly, in obtaining processes which give an increased yield, lowering production temperatures and costs? A. Yes, it is an interesting problem because of the very valuable nature of this dyestuff. The interest has been world-wide. For instance, in this country, you have DuPont, American Cyanamid, Interchemical Corporation, General Aniline and Film, National Aniline, United Color, and others.

Q. How about abroad? A. In the foreign countries this situation exists, in England, the Imperial Chemical Industries, Limited; in Germany, the I. G. Farben-industrie; in Switzerland, Society of Chemical Industry in Basle; in Italy, Montecatini; and in Sweden, Svenska Oljeslageriaktiebolaget (SOAB), to mention some.

The Court: Now, the Montecatini.

Mr. Moore: That is spelled M-o-n-t-e-c-a-t-i-n-i.

The Court: Well, there is no question about it, that they are all interested in some particular field, all interested, particularly interested in the production of this chemical substance by one means or another to increase the yield, is that the purpose?

The Witness: That is right.

By Mr. Ely:

Q. And they are all active in the field and have been over a period of time? A. That is right, enormous research staffs and resources.

The Court: What is the end result on use for the dyestuff, what is the practical application of this dyestuff?

The Witness: Well, almost anywhere where a very fast bright blue organic pigment is employed, for instance, in some of your enamels that have been used on the fenders of automobiles, like the Cadillac and Lincoln; in rubber, on fabrics. Some of the other applications include three-color process printing where it is one of the primary colors, because of the very pure blue shade. In three-color printing you have reds, you have yellows, you have blues, what they call the primary colors. This is a very pure, fast blue pigment, characteristics that the prior art blue pigment dyestuffs lacked. For that reason, copper phthalocyanine fills a very great need and occupies a unique place.

By Mr. Ely:

Q. Isn't it also true—you mentioned the purity of the color in color printing—in fact, it is the only really good pure blue pigment for color printing? A. Yes, in terms of brightness, purity of shade, terms of fastness, it is highly important. With blue printing ink pigments, available up until a few years ago, the color entirely faded away. Well, that was very characteristic of blue pigments, up until this discovery.

Q. How about fastness? You mentioned fastness. Give the Court comparative examples of the fastness of prior art blue pigments and the fastness of copper phthalocyanine blue pigments, say, under exposure to weathering and sunlight. A. Well, I think probably I might make a little bit different comparison which I think will bring out the point a little bit better. For instance, if one would take the ordinary blue dyestuff and put it on a fadeometer, which is the standard for judging these materials, you would get a very noticeable breakdown in say about fifty or sixty hours on the fadeometer, and with copper phthalocyanine it would be pretty close to five hundred hours continuous operation, or in that range, before a noticeable breakdown occurred.

Q. An hour on the fadeometer is equal to several months exposure to sunlight? A. Yes, around that proportion, that is right.

Q. Will you outline your process to the Court, Mr. O'Neal? A. Yes, my process consists in reacting copper acetate with phthalonitrile in an ammonia-saturated nitrobenzene diluent at one hundred and thirty to one hundred and thirty-five degrees Centigrade.

Q. Those are the preferable temperatures? A. Yes.

Q. And about what yield do you get? A. I get yields from ninety percent to one hundred percent of theory.

Q. Now, getting back to the question, so that we can explain our particular raw materials, getting down to these particular materials, instead of talking about flour and cakes, talking about these particular materials, what is the purpose of phthalonitrile? A. It reacts with the copper salt and serves to form the tetrabenzoporphyrazine ring.

The Court: That is the molecular structure you are talking about?

The Witness: Yes, that is right.

By Mr. Ely:

Q. What is the purpose of copper acetate? A. The copper acetate furnishes copper which serves to form the nucleus of the tetrabenzoporphyrazine ring.

Q. What is the purpose of the ammonia-saturated nitro-benzene diluent? A. The purpose of that is that the two, taken in combination, or in conjunction with the copper acetate, seem to catalyze the copper phthalocyanine formation so it proceeds very, very smoothly, and produces a very, very good yield.

Q. What do you mean by saying that it proceeds smoothly? A. Well, I mean by that there is no violent exothermic reaction which you find in the prior art, in fact, that there is no undue froth or foam or other objectionable side reactions chemically.

Q. On the basis of what was known of these ingredients, namely, the phthalonitrile, the copper acetate, the diluent,—that is to say, the ammonia-saturated nitrobenzene—all those ingredients, what was the likelihood, in view of the prior art that—or rather, what was known about them in the prior art that would suggest that you would have a smooth reaction or a non-violent reaction? A. Well, if you believed the prior art, you would think it the better part of discretion to keep your distance and avoid getting entangled with them.

Q. In other words, you feel, from what was known in the prior art about these materials, that you would likely have a violent reaction? A. That is right.

The Court: You mean, used in combination?

The Witness: That is right. I might be a little bit more specific, and just cite a little of the prior art which I have in my notes here.

For instance, it has been well known that if ammonia gas were heated, it is a highly explosive material in air. See Brandt, Chemical Metallurgical Engineering, Volume 44, pages 157 and 158, published in the year 1937. The International Critical Tables II, page 176, 1927, point out and make a specific note that ammonia gas is apt to explode in air. Most of us have probably heard at one time or another instances of explosions of gaseous ammonia. In refrigeration plants they have often had serious explosions due to leakage of ammonia gas.

There is another constituent of my process that also would appear objectionable. I should mention that copper acetate, or copper salts in general, are well known oxidizing agents and catalysts. I might cite from a very well-known textbook which points this out, that is, Groggins "Unit of Processes in Organic Synthesis," 3rd Edition, 1947, page 436. In addition to that, the copper acetate which I use in my invention has been shown to have greater catalytic activities as an oxidation catalyst than the other copper salts, and published references to the experimentation may be found in Kharmandaryan and Alekseeva, Journal of Russian Physical Chemical Society, Volume 62 at pages 1677 to 1683, 1930.

It has always been well known that nitrobenzene is a very good oxidizing agent, for instance, as pointed out by Groggins, Unit of Processes in Organic Synthesis, 3rd Edition, 1947, page 436.

Taken all in all, the ingredients that I found to be most effective in my process, if we were to believe the prior art would lead one to feel that it would be rather an unhealthy situation to make use of them and unwise to expect processes that would prove of any value.

Q. Well, the type of reaction that you might expect from rapid oxidation catalysts would be like the same type of explosion as in the oxidation of gunpowder, is that correct? A. That is right.

Q. And that type of explosion is distinguished in the art from the so-called detonation explosion, such as you would get with TNT? A. That is right.

Q. Both the nitrobenzene and the phthalonitrile that you are using are cyclic organic compounds containing nitrogen, carbon and hydrogen, somewhat related to TNT. Now, actually, under the gunpowder type of explosion that you might expect from the prior art, using the same ingredients, could you have also the TNT type of explosion? A. If one went on the basis of the prior art and the value which ordinarily most of the chemists have given it, you might say that the chances would be quite good. In fact, I think that anyone who works with aromatic compounds containing carbon, hydrogen and nitrogen, and oxygen, of course, would have to take quite good precaution.

Q. Now, in view of this knowledge of the prior art, under what conditions did you carry out your very first reaction, according to your invention? A. Well, I used quite small quantities, I used a safety shield with shatterproof glass and stood as far away as I could, and even with that my condition was one involving a great deal of trepidation and misgivings. I stood about as far back as I could, and at the same time be able to run the reaction.

Q. What happened? A. Well, in terms of my fears and misgivings, nothing. The reaction was about as smooth as stirring sugar into coffee. The unusual feature of what did happen was that the copper phthalocyanine appeared in very good yield, an unusual yield, in fact. The reaction gave a quite high quality yield of copper phthalocyanine dyestuff in my reaction mass.

Q. What yield did you obtain? In other words, taking the amount of material you mixed together, how much did you get, how much actual copper phthalocyanine, and how much came out as waste material? A. Came out as what?

Q. What balance came out as waste material? In other words, what percent of copper phthalocyanine did you get, and what percent of waste material?

The Court: On the basis of one hundred percent?

Mr. Ely: Yes.

The Witness: On that basis, my process gave a yield of ninety to one hundred percent of theory.

By Mr. Ely:

Q. How does ninety-five to one hundred percent yield compare with the yield obtained in any organic chemical reaction, particularly in the dye industry? A. That yield is what almost any organic chemist hopes for when he is attempting to run a reaction; not too many of them obtain it.

Q. Now, over and above the ingredients which you have mentioned above, did you use any booster or other catalyst to obtain the high yields? A. No, I did not.

Q. How did you control your high yields then? A. Well, one of the great determinants of your yield is the temperature at which you operate and the copper salt which you use.

Q. What are the preferred temperatures? A. The preferred operating temperatures are around one hundred and thirty to one hundred and thirty-five degrees Centigrade.

Q. Translate that into Fahrenheit. A. Well, one hundred and thirty to one hundred and thirty-five degrees Centigrade is the equivalent to two hundred and sixty-six to two hundred and seventy-five degrees Fahrenheit.

Q. That is about fifty to sixty degrees Fahrenheit over the boiling point of water? A. That is right.

Q. What temperatures were employed by the prior art processes? A. The prior art processes made use of reaction temperatures around one hundred and eighty-five degrees to three hundred degrees Centigrade.

Q. Translate that into Fahrenheit. A. That is three hundred and sixty-five to five hundred and seventy-two degrees Fahrenheit.

Q. That is, from about half again as much as the boiling point of water to almost three times the boiling point of water, is that correct? A. That is approximately right.

Q. What happens if you raise the temperature of your reaction above a hundred and thirty to a hundred and thirty-five degrees Centigrade? A. As you start to raise the temperatures much above the preferred temperature, the yield starts to go down, and as you get up to the approximate temperatures most of the prior art employed, it drops about twenty percent or more.

Q. What happens, if you carry on the reaction, possibly at lower temperatures than the preferred range of one hundred and thirty to one hundred and thirty-five degrees Centigrade? A. As you go lower in the temperature range embodied or taught in my process the yield likewise drops. For instance, at reaction temperatures of eighty-five to ninety degrees Centigrade, you would get no yield.

Q. Excuse me, the table you are referring to now is on page 9 of your specification? A. That is correct, Table I, page 9 of the specifications. As you increase the temperature gradually toward one hundred and thirty to one hundred and thirty-five degrees Centigrade, your yield continues to rise until you get to the optimum yield.

Q. Now, at the time you made your first invention, was there any published disclosure of any processes of carrying out a reaction to produce copper phthalocyanine where the reaction was carried out in ammonia-saturated nitrobenzene?

Mr. Moore: I object.

The Court: Well—

Mr. Moore: To his knowledge.

The Court: If there was, and I assume there is—

Mr. Moore: Yes, but the question was not limited to the witness' knowledge of the prior art.

The Court: So far as you know, now.

The Witness: That is right, no.

By Mr. Ely:

Q. Was it known in the prior art to use phthalonitrile as one of the reagents producing copper phthalocyanine? A. Yes.

Q. Were those processes using phthalonitrile regarded as satisfactory in the art? A. No, because of the exothermic reaction and the lowness of the yield and the unsatisfactory operational hazard.

By the Court:

Q. Well, no process is regarded as having reached the ultimate of satisfaction in chemistry, that is so—otherwise there would be no research. A. That is right, we chemists would be out of business.

Q. You get closer to your goal, though? A. That is right.

By Mr. Ely:

Q. Was copper acetate as such known as a compound for reaction with other ingredients to produce copper phthalocyanine? A. Yes, it was.

Q. Where? A. Well, it was known as a possible substitute for copper and copper chloride in certain types of reactions not like mine, but always mentioned in a list of possible substitutes, and it was really a fourth or fifth rate material.

The Court: Copper is blue, according to my recollection.

The Witness: That is right for certain compounds.

The Court: Copper is blue, according to my recollection of my chemistry.

Q. Copper compounds frequently have blue colors. A. That is right, and copper acetates, so-called, were fourth or fifth rate materials, and I might read here from a pertinent comment to that effect. One of them is from an article on copper phthalocyanine by C. E. Dent and R. P. Linstead.

By Mr. Ely:

Q. Would you point out Linstead's standing in the art so far as copper phthalocyanine is concerned? A. Linstead is termed one of the authorities in the copper phthalocyanine dyestuff field, in fact, he was the individual that elucidated the structure of copper phthalocyanine and he and his associates are primarily considered—particularly Dr. Linstead, as the ones that made the study of pigment itself, and the possibility of the scope of application, so he is one of the ranking authorities.

Q. He is the man whose work identified the dyestuff, after it was discovered accidentally in Scotland, is that correct? A. That is right.

This is an article by C. E. Dent and R. P. Linstead, Journal of the Chemical Society, 1934, page 1027, to 1031, and they have this to say:

> "The formation of copper phthalocyanine from copper oxides and acetate, sulphite and sulphate does not call for special comment, but it is worthy of note that copper sulphides appeared to provide copper for the reaction by liberating sulphur, there being no nuclear substitution. Similarly, the use of sulphate did not give any nuclear sulfonation. None of these substitutes are satisfactory in practice as were the metal or the chlorides."

Then I might make this statement, it was quite commonly known in the art, in this field, that the sulphate and other compounds, outside of metallic copper and cupric halides were unsatisfactory. In fact, Lacey in U. S. 2,302,-

612, which patent was cited by the Examiner, has this to say on page 1, column 1, lines 9 to 11:

> "In the practical processes only two classes of copper containing compounds have been used, namely, metallic copper itself and copper halides."

Q. Would you say—let's start it this way, the copper acetate that you make use of is neither metallic copper, nor is it one of the copper halides? A. It is neither of those two.

Q. What are the copper halides mentioned by Lacey? A. He mentions two, copper chloride and copper bromide.

The Court: We will suspend at this time for our morning recess and we will re-convene at 11:30.

(Whereupon, there was a brief, informal recess.)

By Mr. Ely:

Q. Mr. O'Neal, with particular reference to the reference mentioned by Mr. Moore, Lacey says he uses only two classes of copper containing compounds in getting his copper phthalocyanine, namely, metallic copper itself and copper halides, and you point out, of course, that your copper acetate is not a copper halide.

The Court: To refresh my recollection, what is a halide?

The Witness: Well, a halide is a generic term used to cover the salts of a metal that are classified as chlorides, bromides, fluorides. They call them halides. The iodides belong in this class too.

By Mr. Ely:

Q. What are the copper halides mentioned by Lacey? A. He mentions the copper chlorides and copper bromide compounds.

Q. Can you distinguish your copper acetates from the metallic copper and copper halides and some of the other copper bearing materials in the prior art such as sulphate and the like, how does your copper acetate differ from the other copper bearing materials? A. Well, mine is copper acetate. This is an organic compound,—

Q. In other words, an organic? A. A metallo-organic compound.

Q. And the other is what class? A. They are inorganic compounds.

Q. Entirely? A. That is right.

Q. So that of the two preferred copper bearing agents employed in the prior art—metallic copper and copper halides,—which was the preferable one? A. Copper chloride was preferable because it gave a fairly good yield at lower temperatures, but it had the objectionable feature that it also gave some chlorination.

Q. What happened when you obtained the chlorination you speak of? A. When you obtain the chlorination you did not exactly obtain copper phthalocyanine, you obtained a derivative of copper phthalocyanine, in other words, a chlorinated copper phthalocyanine.

Q. That is not, as I recall it, a pure blue color. A. It has a greener shade than copper phthalocyanine.

Q. What happens if you substitute copper or copper chloride or other copper bearing compositions for the copper acetate in your process? A. Well, you cannot exactly term them substitutes. For instance, if you employ copper chloride, and I will refer to Table I on page 9 of my specifications here, if you employ metallic copper at any temperature for the reaction you get no yield; if you employ copper chloride you would get around forty-two percent yield.

Q. Excuse me, at what temperature do you get the forty-two percent yield of copper chloride? A. That is at reflux temperature.

Q. What does that mean? A. That is at the boiling point of two hundred and ten to two hundred and twenty degrees Centigrade.

Q. That is well above where you obtain your optimum yield, using your materials, is that correct? A. That is right, yes.

Q. You have mentioned the Lacey patent in your previous testimony. You have studied that patent, have you not? A. Yes, because it was a patent cited by the Examiner.

Q. What is the nature of the process disclosed by Lacey? A. To the individual that gave the Lacey disclosure a casual examination, the two processes would appear to be closely related, but that is not the case. In the first place Lacey expresses the comment that the copper halides are the most feasible copper salts to use, and secondly he points out that the most satisfactory yields are obtained at quite close to the reflux temperature of his nitrobenzene, and thirdly, he points out as part of his disclosure the necessity for using what he terms "boosters," for instance, phthalimide, ammonium chloride or small amounts of water.

Q. Is the actual chemical reaction or theory of the Lacey process as stated in the patent the same type of reaction as you obtain? A. No, it is not. Lacey uses his ammonia saturated nitrobenzene in order to prevent chlorination of his copper phthalocyanine, and his teachings or disclosure expresses and describes the importance of this.

Q. At what temperature did Lacey carry out his process? A. Well, I think I can better answer this by referring to page 2, column 1, lines fifteen to twenty-three—excuse me, is that Exhibit C of the Patent Office?

The Court: What is the reference again?

The Witness: Page 2, column 1, lines 15 to 23, and Lacey has this to say:

> "The process of the present invention does not require a critical control of temperature, the best results are obtained around 200° C., for example 180°-220° C., but the reaction also proceeds at lower temperatures

down to 100° C., and higher temperatures obtained around 200° C."

Q. At the lower temperature Lacey mentions reaction as low as one hundred degrees Centigrade, does Lacey show any example in his patent of any reaction occurring as low as one hundred degrees Centigrade? A. In examples 2 and 3, pages 2 and 3 of the Lacey patent, he mentions the temperatures of one hundred degrees and, another example, example 3, a hundred and ten to one hundred and twenty degrees Centigrade, and this is at the point where pigment formation starts. As a reference to temperature—

Q. That is not where the reaction actually goes on? A. No, it merely starts; some slight coloration may take place. That would be my interpretation to what happens there, and there is a further distinction in these two examples also, which illustrate the use of his boosters. In example 2, he employs phthalimide, and in example 3 he employs phthalimide, water, and ammonium chloride. These boosters are entirely unnecessary in my process.

Q. At what temperatures do reactions start where Lacey does not use boosters, according to the Lacey disclosure? A. The only example that Lacey gives for manufacturing copper phthalocyanine is in example 1.

Q. You mean without boosters? A. That is right, without boosters, and for copper phthalocyanine, and in example 1 he states that—this is in lines 43 to 45 and he says:

> "The pigment formation starts at 150-160° C."

Q. That is where it starts, where is it actually carried on, the reaction, even in example 1? A. In all of his examples he uses the reflux temperature, which is two hundred and ten to two hundred and twenty degrees Centigrade.

Q. Take example 1 of Lacey, where Lacey uses no booster, and he says his reaction starts at a hundred and fifty to a hundred and sixty degrees Centigrade, how does that temperature of Lacey's starting reaction compare with the temperature at which you obtained your optimum yield of ninety to one hundred percent? A. Well, it is twenty to thirty degrees Centigrade higher than mine where his pigment formation actually just begins to start, whereas in my process I obtain my optimum pigment formation temperature at one hundred and thirty to one hundred and thirty-five degrees Centigrade.

Q. What kind of yield does Lacey say he obtains in example 1? A. In example 1 Lacey says he obtains a very good yield.

Q. How long does it take Lacey to obtain his so-called "very good yield" in example 1, which he actually carries out at two hundred and ten degrees Centigrade? A. Four hours.

Q. How long does it take to obtain the nearly theoretical yield of your process at your lower temperatures? A. In my specifications, Table 1, page 9, I point out that at a hundred and thirty-five degrees, for one hour I get approximately ninety-one percent of theory yield, whereas, if you look further down to the bottom of my Table 1, with copper chloride at the reflux temperature, under the same conditions, approximately forty-two percent of theory yield.

Q. What are the essential differences between Lacey and yourself? A. The essential differences, if I would summarize, are two-fold; one is the nature of his copper salts, that is highly important, and the other is the fact that my temperatures are giving me—

The Court: Let me say that page 2 of the specifications, line 24—rather, line 16, Lacey says, "The process of the present invention does not require a critical control of temperature, the best results are obtained around 200° C., for example 180°-220° C., but the reaction also proceeds at lower temperatures down to 100° C., and higher temperatures up to 300° C., but the results are not as good as those obtained around 200° C.''

Do I understand by that that you say the essential differences are, one, the nature of the copper salts used, and you regard your temperature as critical. If you regard your temperature as critical, your temperature range is important—

The Witness: When I say critical, I refer to getting the optimum yield. There is a further distinction there, in that Lacey brings out that he has to use boosters.

The Court: You see, my problem is this before I get through, the question raised is as to the patentability of your claim. Query: whether or not an individual skilled in the art as you are, in reading the Lacey application might conclude by variation, the fact that by using a variation, for example, of temperatures, you might achieve the result that you have achieved, and he would be helped in some way by what Lacey had done—do you see what I mean?

The Witness: Yes, sir, and my comment to that would be, Your Honor—

The Court: The Patent Office is going to say—well, I think they are going to say this: ''While you have achieved optimum in result, Query: whether or not what you have achieved is patentable because of the prior invention; a person skilled in the art such as you are and reading the Lacey claims might conclude that variation of the factors used by him, for example, temperature not so high, temperature not so low, might be very desirable, and as a consequence of experimentation might reach the conclusion as a result of the experimentation that you would get a better result, and get an optimum result by varying so many degrees?''

Mr. Moore: I would also indicate that there is no suggestion in the application of Mr. O'Neal, or in the claims, that one hundred and thirty to one hundred and thirty-five degrees is a critical temperature.

The Witness: May I comment on that?

The Court: I want you to, because that is the problem that I have got to resolve.

The Witness: I would like to point out at this juncture, that I disagree with your statement that there is no mention—

Mr. Moore: I said critical, Mr. O'Neal, that is the important—

The Witness: I might point out that is somewhat like this, to some people, however, a dye would be fairly difficult to make, and to others it would be easy, that is because it has been brought out in this Table 1 that the optimum yield, by using the temperatures of the yields that were obtained, and it is a case of the judgment, at which point, and naturally, people that are working in the chemical field, and manufacturing processes, have to stand on its merits.

The Court: He uses the copper halides so-called.

The Witness: Yes, sir.

The Court: And he uses copper bromides, and also uses ammonium compounds, the three of them at certain temperature ranges.

The Witness: Yes, sir.

The Court: And you use them the same?

The Witness: I use copper acetate salts.

The Court: What is the distinction?

The Witness: Well—

The Court: I mean, with reference to what he uses and what you use?

The Witness: Well, the point there is that he uses an entirely inorganic copper salt, and I am using a copper organic salt, that is one difference; the other is, he points out in his specifications that for his best use—the best treatment of his application, that these boosters are necessary and they are quite important to get his optimum yields, which I do not have to use, and I might point out at this stage, in example 2, particularly, where it describes these boosters, he uses one thousand and twenty-four parts of phthalonitrile to one hundred and two parts of phthalimide—that is roughly ten percent booster he has to employ at this point. Now, that is a point where he has to use a material which is not—you would have to have a greater reaction volume—there is an economic problem connected with the recovery of that material, and in my process you do not have that.

The Court: Well, aside from that, what have you discovered that is not either explicit or implicit in what Lacey has claimed?

The Witness: I have discovered that by the use of a copper acetate salt, which is contrary to the teaching of Lacey, and which is contrary to the teaching of the prior art, that instead of obtaining these lesser yields which were experienced, as I have stated, in the earlier literature references from Dr. Linstead, that copper acetate was an inferior salt, nevertheless, with my process, it is the best salt to obtain the best yield.

The Court: Then your contention is this, that, having regarded copper acetate as an injurious salt, they didn't use it, but you went ahead and used copper acetate and satisfied yourself that you would get a better result?

The Witness: The problem is just a little bit more complicated than that. May I make a comment along this line here, as to how I arrived at copper acetate as giving a different and better reaction?

The Court: Well—

The Witness: When I was assigned to this problem some years back, the first thing I did was to cover the prior art to see what had been done. I ran some experiments duplicating what I considered typical of the best examples of the prior art, and I came to this fact, that all the prior processes were objectionable because of the exothermic and violent reaction when the color formation took place.

The Court: Exothermic means heat liberation.

The Witness: Right. I got the heat reaction, and I naturally considered, and thought about what I could do to correct that. After going through a number of experiments in an endeavor to reduce the heat of reaction by means of a diluent, I discovered that nitrobenzene was the best diluent. That was still not entirely satisfactory. I also noticed in running these reactions that there was ammonia liberated from these reactions that there was ammonia liberated from these reaction masses. It occurred to me that, well, possibly that was why the yields were low, because of this ammonia being liberated, and if I could arrive at only some means of keeping the ammonia in the reaction mass, I would keep the various elements from decomposing during the course of the reaction. Another thing that led me to that was that copper salts pick up ammonia when in an anhydrous state, somewhat like some materials pick up water. So I tried runs with copper chloride, and I tried copper sulphate. My yields were not good. So I thought about it a little more, and noticed that there seemed to be a stage at which my copper salt would sink down to the bottom of my reaction vessel. So it occurred to me, well, maybe if I had some kind of a copper organic salt I would be able to get a better solubility in my reaction, and get a better contact and thereby cause the reaction to take place better. I tried the copper acetates, and I discovered that they gave me much better results than I got with the copper sulphates or copper chlorides of the prior art. In fact, I had to discard these salts. Then I kept at it, until I discovered the point where I realized the optimum temperatures, which is where the best results were obtained.

Mr. Ely: Your Honor, I think I can summarize in a way, this is getting rather argumentative.

The Court: It is getting rather argumentative?

Mr. Ely: Insofar as Lacey is concerned, I want to tell Your Honor this: The prior art indicates that one should reject the acetates in favor of other copper bearing material. O'Neal went directly contrary to what Lacey tells should be used. Lacey tells that one should use the metallic copper or copper halides; and that is in accordance with Dent and Linstead and the other prior art. Then O'Neal comes along and he finds that he gets superior yields without boosters or anything, at much lower temperatures. Now this is all evidence pointing out that O'Neal's is actually a different process. In other words, I think Mr. O'Neal's and Lacey's processes, superficially considered, might seem rather close together. As a matter of fact, they are actually quite different.

The Court: Does that conclude your direct examination?

Mr. Ely: No, sir, not quite.

By Mr. Ely:

Q. One thing more, Mr. O'Neal, in this testimony you gave here, you have explained to the Court about the way you arrived in your invention, I think.

I want to bring this out:—You noticed that your phthalonitrile broke down and you got ammonia. Was there any indication in the prior art about the release of ammonia and the breakdown of phthalonitrile, such as in the well-known phthalonitrile reaction?

The Court: I thought he testified that by following up the experiments indicated by the prior art that ammonia was released, and I thought that was to keep the ammonia in.

Mr. Ely: I know, but that was something not noticed in the prior art, I take it, when you followed the prior art processes, O'Neal was the first who noticed that ammonia was released.

The Witness: Yes, sir.

By Mr. Ely:

Q. Did the prior art tell you ammonia was released? A. No.

Q. Now, at the time you had perfected your invention—here we come to another point—at the time you had perfected your invention and first filed your patent application covering it, had the Lacey patent been granted or published? A. No, my patent application was filed in February of 1941 and Lacey's patent issued in November of 1942.

Q. At the time you had perfected your invention and first filed an application covering and disclosing it, was there any publication of even rumor in the industry, or any contact between you and Lacey or Lacey's associates, the American Cyanamid, by which you could have known about the Lacey process? A. No.

Q. When did you have first knowledge of the Lacey process? A. I had my first inkling that this patent existed when I examined the Patent Gazette in November, 1942.

Q. Was there any other way that you could have known about Lacey? A. No, there was not. In the first place, it is contrary to the chemical profession ethics to take credit for something someone else has discovered. In addition, it was my responsibility as a research chemist, and I am held responsible for keeping up with the society lectures and for the publications, foreign and domestic, as to what are the latest developments through what has been published. The Lacey patent application was inaccessible then, being merely an undisclosed application in the Patent Office.

Q. Well, aside from that aspect of it, Mr. O'Neal, I want to bring out—assuming that you had known of the Lacey patent at the time you made your invention, and this, I take it, comes right down to what the Court wants to know here, would Lacey's disclosure as it is now, ever have suggested to you, as one skilled in the art, that the copper acetates would produce far superior results over the copper chlorides, in view of what was known about the acetates in the prior art? A. If anything, I would have gained exactly the opposite trend of thought from what Lacey teaches in his patent.

Q. Now you said that in the course of your work it was necessary to go over publications and other literature in the art. That includes patents, does it not? A. It does.

Q. Now, in watching out for what other people are claiming, have you noticed, in your studies, from your point of view, what the scope of Lacey's claims are? A. The two inventions, in my interpretation of them, stand separate and apart. Lacey does not claim my invention nor do my claims cover Lacey's invention. The two are separate and distinct in that sense.

Mr. Ely: That is all of the direct examination.

The Court: Now, gentlemen, I take it Mr. O'Neal is your only witness.

Mr. Ely: Yes, sir, he is our only witness.

The Court: Well, the Assignment Commissioner has sent down several matters that are before me at 12:00 o'clock. If that is the situation, then I will suggest to you gentlemen that you come back and we will find this afternoon, if that won't inconvenience you. We will only go until 12:30 anyway, since there is a meeting of all the judges today, and instead of reconvening at 1:45 as usual, we will reconvene at 2:00 o'clock.

(Whereupon at 12:00 o'clock noon, there was a recess until 2:00 o'clock p. m. of the same day.)

Afternoon Session.

(The proceedings were resumed at 2:00 o'clock p. m. at the expiration of the noon recess.)

Mr. Ely: Your Honor, there are a couple of questions which I would like to bring out in further direct.

The Court: All right.

Thereupon Grady M. O'Neal, the witness under examination at the time of the taking of the recess, resumed the stand and was examined and further testified as follows:

Direct Examination by Mr. Ely (Resumed).

Q. Mr. O'Neal, this morning we referred to the Lacey patent and examples 2 and 3, I believe, and following that, example 1. Example 1 uses no booster at all, and you show by your table on page 9 of your specification that you obtained a forty-one percent yield, which Lacey classified as very good. Now, by using boosters Lacey stated he obtained in example 2, using a booster, "an excellent" yield. Have you carried out example 2 of the Lacey disclosure so that you could determine, percentagewise, what Lacey was classifying as an "excellent yield"? A. Yes, I have had experiments run to determine just what was meant there by "excellent." By "excellent" Lacey means an 80.8 percent based on the phthalonitrile and 74.2 percent of theory based upon phthalonitrile plus phthalimide.

Q. In other words, with phthalonitrile plus booster he gets a yield of about seventy-four percent? A. That is right.

Q. Now, in example 3, Lacey says that where he uses phthalimide and two hundred parts of ammonium chloride, and along with a booster, he obtains "a practically theoretical yield." Have you had example 3 carried out to find out what sort of yield Lacey would classify as practically theoretical? A. Yes, I have, and by "practically theoretical" Lacey means seventy-three point nine percent based upon phthalonitrile and phthalimide.

Q. You determined this percentagewise by running Lacey's example exactly as given in the patent? A. That is right.

Q. To bring out again, when you say you obtain nearly theoretical yield, you mean what percentage yield? A. When I say nearly theoretical, I mean close to one hundred percent, that is ninety to one hundred percent of theory.

Q. And that is apparent from your application? A. That is right.

Q. Just one additional matter, and that is, where Lacey uses no booster, his reaction starts, according to example 1 at what temperature? A. At one hundred and fifty to one hundred and sixty degrees Centigrade.

Q. And in order to obtain the lower temperatures, which would be down where you obtained your optimum yield, Lacey would have to use a booster, as shown by his patent, is that correct? A. That is right.

Cross Examination by Mr. Moore.

Q. Mr. O'Neal, you say that Lacey in his example 1 used no booster, that is true, isn't it? A. Yes, sir.

Q. Now, is it also true in example 4 there is no use of a booster? A. (Examining example 4). That is right.

Q. Would you say it is also true with example 5? A. That is right.

Q. Now you have expressed some familiarity with the patent claims. Do you find any reference in any of the claims set out at the end of the Lacey patent to the use of a booster? A. No, there is no mention.

Q. Do you find any temperature limitations in these claims? A. In two of the claims, yes.

Q. Which claims, 2 and 3? A. Yes.

Q. Do those temperature limitations come within the temperature limitations expressed in the claims you are seeking here? A. Only in the sense of degree, that is, in the sense that I point out in my Table 1 on page 9 of my specifications, I said a temperature in that approximate range may be used, but it is not one that is the optimum temperature for my process.

Q. By optimum you mean preferable temperature, don't you? A. By optimum I mean a temperature which is the most economic and feasible to operate.

Q. You do not characterize it as a critical temperature? A. Inasmuch as the yield has quite a bearing on the outcome, whether it is economic and feasible—

Q. In other words, between one hundred and thirty degrees and one hundred and thirty-five degrees you get your best yield? A. That is right.

Q. But your invention is not limited to any such simple temperature range by degrees, is it? A. That is right.

Q. In view of your reference to your application, I show you page 6 of it, you say:

> "The operating temperature for the process of this invention may vary from 115° C. up to the reflux temperature of nitrobenzene."

A. That is right.

Q. What is the reflux temperature of nitrobenzene? A. That is approximately two hundred and seven degrees Centigrade.

Q. You have also mentioned two hundred and ten to two hundred and twenty degrees here. Would you say it is also as high as two hundred and twenty degrees? A. The reason why the temperature varies at that point, when I say two hundred and seven degrees Centigrade is, that this is the boiling temperature of nitrobenzene itself. When these other reactants are put in, the boiling temperature is raised to arrive at around two hundred and ten to two hundred and twenty degrees Centigrade.

Q. It might be as much as two hundred and twenty degrees? A. That is right.

Q. In fact, you have the minimum temperature expressed in your claim as low as one hundred degrees Centigrade, isn't that true—look at claim 14. A. That is right.

Q. So, in your invention you describe a temperature range from one hundred degrees to as much as two hundred and twenty degrees Centigrade? A. In the broader sense, that is right.

Q. That is what you are claiming? A. Right.

Q. Now you referred to an article by Linstead, is that right? A. What is that?

Q. You referred to an article by Dent and Linstead. A. That is right.

Q. The Journal of the Chemical Society, 1934, pages 1027 to 1031, is that true? A. Well, let me check that—1934, pages 1027 to 1031.

Q. Yes, and you have incorporated a reference to that in your application, haven't you? A. Yes.

Q. And there is a paragraph devoted to it at page 4 of the specifications. A. Yes.

Q. Is that Linstead the same individual who is given as the inventor's name in this patent No. 2,166,213, Reginald Patrick Linstead? A. Yes.

Q. And what Linstead has said in that Journal of the Chemical Society must be interpreted in view of what he has also stated in the patent, is that true? A. That would be a reasonable deduction.

Q. And you have mentioned the caution which you exercised in your first experimentation with the compounds named in these claims in your application. As a careful organic chemist you would use the same caution in any experiment, would you not? A. Well, not to the extent of being afraid that something was going to happen which might either maim or disable me. In other words, what I am trying to get across is that when one attempts reactions that normally proceed with a certain degree of smoothness, you do not look for unfavorable results that would damage the experiment.

Q. If you are going into a new field you are going to use caution, as a general rule. A. That is right, but one of the basic tenets which chemists operate upon, what he has studied in his school, and what the literature and the textbooks teach, is that where you work with materials that are poisonous, you naturally take better precautions, naturally, over materials that are not so hazardous and poisonous. In the same way, for materials which the art has taught are hazardous by way of fires or explosions, you would observe more than ordinary precautions.

Q. Your application here in suit, serial No. 479,500, filed March 17, 1943, makes reference, does it not, to this Lacey patent which has been cited by the Patent Office? A. Yes, sir.

Q. Now, your application purports to be a continuation in part of Application Serial No. 376,045, filed February 15, 1941. Your original application did not make reference to the Lacey patent, did it? A. That is right.

Q. This Lacey patent issued between the filing of your original application and the filing of the continuation in part, is that true? A. That is right.

Q. Now, Lacey has a reference to yields on page 2, column 2, the first paragraph. Does he not say there that the yields he obtains approach theoretical? A. Yes, he does.

Q. How far does your experiment go to confirm that? A. My experiments were run on the basis of duplicating runs for these three examples which cover copper phthalocyanine, and of course, the main purpose in running these experiments, was to try to determine just what Lacey meant by saying, for example that he obtained a "very good" yield in example 1, an "excellent" yield in example 2, and a "practically theoretical" yield in example 3.

The Court: I am somewhat in doubt as to the use of that term—I assume is used in your profession, "approaching theoretical," what is meant by that?

The Witness: In a term like that, which is a vague term,—if you were to use an analogy, someone is approaching you. Well, how close is he approaching, where you are? It is an indefinite and vague term.

The Court: In everyday usage, it depends upon how far away he is, how far away are you. I am just wondering, Lacey states here, "the yield obtained by the processes of present invention are excellent, and approach theoretical, even when the material has been purified" and so on. I am trying—I am somewhat in doubt as to what is meant by "approaching theoretical." Is that an optimum desire that cannot be approximated?

The Witness: Theory is perfect. You can do no better than that.

The Court: All right.

The Witness: In other words, that is one hundred percent.

The Court: I see.

By Mr. Moore:

Q. In any ordinary chemical process seventy or seventy-five percent yield would be considered excellent, would it not? A. Well, I would rather determine it somewhat like this, it probably would be good. I would use excellent when you are approaching theoretical. In other words, that is about five to ten percent or fifteen percent, in that range, in other words, close to theoretical.

The Court: Say eighty-five percent instead of seventy-five percent, you would say eighty-five percent or ninety?

The Witness: That is what I would say, because that is very close, that would be my interpretation.

Mr. Moore: No further questions.

Re-Direct Examination by Mr. Ely.

Q. I believe you told us just before Mr. Moore's examination you did run experiments to find out what Lacey meant by "excellent" and "approaching theoretical." You found, if you followed his teachings, that in example 3, the reaction would result in yield about the same as in example 2. You learned that Lacey's "practically theoretical" yield if you followed example 3,—I believe your previous testimony was—came down to less than seventy-five percent, is that correct? A. That is right.

Q. And I believe Mr. Moore asked you if you carried out example 4, in which no booster is used, and you conceded that. But I call your attention to the second paragraph there as to what Lacey says in example 4, where he uses cupric bromide without boosters. What kind of a yield did he obtain? A. Well, sir, the reason why this fourth example was not duplicated was in view of what Lacey said there himself; that "if in this case the ammonia is omitted, only a very poor yield of a pigment containing bromide is obtained, and during the reaction hydrogen bromide is evolved." And that duplicated in a way the conclusion I had reached earlier about the necessity for ammonia being present.

The Court: Well, I understand you to testify that one of your prime problems was to devise some method or means by which ammonia was retained rather than permitted to go off.

The Witness: That is right.

The Court: And that was one of the essential characteristics of your process?

The Witness: Yes, sir.

By Mr. Ely:

Q. One more thing, would you say that, in the light of the prior art existing at the time you made your invention, and also when Lacey made his invention, that a seventy-five percent yield might be an excellent yield or a good yield? In other words, the prior art processes may or may not have been less than that to provide a good yield. Would you say that if a yield normally was only fifty percent then, of course, a seventy-five percent yield would be excellent. Is that one of the best ways of explaining the term "excellent" as used by Lacey? A. Well, I have not thought or really tried to interpret just what Lacey meant by his thinking. That was the reason why these experiments were run, to try to determine, on a definite basis, just what was meant. So I followed his directions. But my own interpretation of yield is given in terms of a stoichiometric equation. On a stoichiometrical basis, you can learn what Lacey means by "close to theory," or what Lacey terms "excellent." But when you get considerably below that, depending on the reaction, if it is between fifty and seventy-five percent, I think that it is logical that this is just about what you would term a good yield.

Mr. Ely: That is all I have.

The Court: Is that all?

Mr. Moore: No further questions.

FINDINGS OF FACT AND CONCLUSIONS OF LAW.

(Filed January 10, 1950.)

1. This is a suit brought under the provisions of Section 4915 R. S. (35 U. S. C. 63) in which it was sought to have the Court find that plaintiff, The Sherwin-Williams Company, as the assignee of the patent application of plaintiff, Grady M. O'Neal, Serial No. 479,500, filed March 17, 1943, is entitled to have a patent issued to it containing claims 1, 2, 5, 6, 9, 13, 14, 17, 20, 21, and 22 of the said O'Neal application in suit. This application is a continuation-in-part of an earlier parent application, Serial No. 379,045, filed by O'Neal on February 15, 1941, abandoned in favor of the application in suit. The effective filing date of the application in suit is February 15, 1941.

2. The O'Neal application in suit discloses and claims a process of producing copper phthalocyanine by reacting a cyclic ortho-dinitrile, such as phthalonitrile, with copper acetate in a vehicle of nitrobenzene saturated with ammonia gas. The reaction commences at approximately 100° C. and may be carried out at temperatures as high as the reflux temperature [boiling point] of the vehicle (210-220° C.). Yields of 24% of theory are obtained in three hours

at 100-105° C., increasing to 92% of theory at 130-135° C., the yields decreasing at higher temperatures to 80% yields at 165-170° C., which 80% yields continue to be obtained up to the reflux temperature. At the preferred temperature range of 130-135° C. yields of 90.8% of theory are obtained in one hour. The reaction is smooth and non-violent. The lack of violence and relatively lower production temperatures available in O'Neal's process effect substantial savings in and simplifies production equipment and also render O'Neal's process safe for production personnel. No additives or boosters are required by O'Neal in obtaining his yield in excess of 90% of theory. O'Neal states that the ammonia in his process combines with the copper acetate to form a highly soluble and reactive complex amminoacetate copper salt. The cupric chloride and other inorganic cupriferous agents of the prior art are not as soluble in the reaction mass of O'Neal's process. O'Neal states that in his process if one employs metallic copper at any temperature for the reaction no yield is obtained.

3. The United States patent to Lacey, No. 2,302,612, which was granted November 17, 1942, on an application, Serial No. 299,262, filed October 13, 1939, is available as a reference against the O'Neal application in suit on the basis of its filing date, and speaks as a reference as of that date.

4. The Lacey patent states at its outset:

> "Many processes have been devised for the production of phthalocyanine pigments, particularly copper phthalocyanine pigments, among the best known being processes in which o-dinitriles have been reacted with various cupriferous compounds or with metallic copper itself. In the practical processes only two classes of copper containing compounds have been used, namely metallic copper itself and copper halides."

The Lacey patent discloses that cupric chloride (a copper halide) may be reacted with a cyclic ortho-dinitrile in a vehicle of nitrobenzene saturated with ammonia gas to produce copper phthalocyanine. Lacey states that the reaction proceeds at temperatures as low as 100° C. and as high as 300° C. but that the results are not as good as those obtained "around 200° C., for example, 180-220° C." In all of Lacey's examples, the reactions are carried out at the reflux temperature of the vehicle.

The yields disclosed by Lacey require a reaction time of three to five hours at the reflux temperature of around 200° C. Lacey's specification states that the process is subject to excellent temperature control.

Lacey discloses cupric chloride and cupric bromide as operative cupriferous compounds. Lacey states that in his process the "ammonia plays a part in the reaction which has not been definitely determined as yet, the most reasonable explanation appears to be that the ammonia acts primarily as a halogen acceptor forming nitrogen and ammonium halide, but other explanations are theoretically possible and the present invention is not limited to any particular theory of action."

5. The United States patent to Heilbron et al., No. 2,166,213, discloses the production of copper phthalocyanine by reacting phthalonitrile and metallic copper or cuprous chloride at temperatures ranging between 180-250° C. The patentees describe the reaction with cuprous chloride as "vigorous"; O'Neal testified that reactions of this type are "violent" and dangerous to production workmen. When employing cuprous chloride, Heilbron et al. obtain (as shown in Example 2) a mixture of copper phthalocyanine and chlorinated copper phthalocyanine (the latter being regarded by Lacey as a contaminant, Lacey, page 1, par. 3).

Following Examples 1 and 2 of Heilbron et al., the patent states that, in lieu of the preferred cuprous chloride or metallic copper, "one may employ cuprous cyanide, suprous and cupric oxides, cupric sulfide, cupric chloride, cupric acetate, and cupric sulfate." As to these substitutes for the copper metal and copper chloride in the type of process disclosed by Heilbron et al., C. E. Dent and R. P. Linstead (a joint patentee in the Heilbron et al. patent) stated:

> "The formation of copper phthalocyanine from copper oxides, acetate, sulphite and sulphate does not call for special comment, but it is worthy of note that copper sulphides appeared to provide copper for the reaction by liberating sulphur, there being no nuclear substitution. Similarly, the use of sulphate did not give any nuclear sulfonation. None of these substitutes was as satisfactory in practice as were the metal or the chlorides." (Journal of the Chemical Society, 1934, p. 1027-1031.)

Linstead, Heilbron, Dent, Wyler, et al. all worked for Imperial Chemical Industries, Ltd., assignee of the Heilbron et al. and Wyler patents.

6. The United States patent to Wyler, No. 2,216,867, discloses a process of producing copper phthalocyanine by heating (at temperatures ranging from 220° to 290° C.) potential phthalonitrile-forming initial materials with cupric and cuprous acetate, cupric and cuprous chloride, cuprous bromide, and copper powder, as cupriferous materials, in the presence of ammino-sulphonic acid or various complex salts thereof. As to prior art processes using phthalonitrile and copper or copper compounds, Wyler refers to the above quoted Linstead and Dent article in the Journal of the Chemical Society (Wyler, page 1, paragraphs 2, 3).

7. The British patent to Heilbron et al., No. 410,814, is the British patent corresponding to the aforesaid United States patent to Heilbron et al., No. 2,166,213, and is pertinent to the same extent as said United States patent.

8. The I. G. Farbenindustrie French patent No. 799,901 relates to the reaction in the presence of nitrobenzene of

phthalonitrile and cupriferous compounds at temperatures ranging from 130 to 200° C. At the end of Example 1, it is stated that one may employ anhydrous copper sulfate or copper acetate in lieu of the preferred copper tetramine chloride. At the end of Example 10, it is stated that in lieu of the preferred cuprous chloride, use may be made of "pulverized copper, copper or oxides or other cupric salts such as cuprous bromide, cupric chloride, copper sulfide, anhydrous copper sulfide or copper acetate."

9. In view of the teachings of the respective United States and British patents to Heilbron et al., Nos. 2,166,213 and 410,814, that in the production of copper phthalocyanines from phthalonitrile and copper or copper compounds, cupric acetate may be used in lieu of copper and cuprous chloride, the indication of the United States patent to Wyler, No. 2,216,867, that cuprous or cupric chloride, and cuprous or cupric acetate may alternatively be used in the manufacture of copper phthalocyanines, and the suggestion in the French patent, No. 799,901, to I. G. Farbenindustrie Aktiengesellschaft, that in the formation of copper phthalocyanines from phthalonitrile in the presence of nitrobenzene, the copper chlorides and copper acetate are all useful, it would be within the expected skill of the art, and hence lacking in invention, to substitute copper acetate for copper chloride in the particular process disclosed by Lacey in his United States patent, No. 2,302,612, by which copper phthalocyanine may be produced by reacting a cyclic ortho-dinitrile and cupric chloride in a vehicle of nitrobenzene saturated with ammonia gas.

10. Claims 1, 2, 5, 6, 9, 13, 14, 17, 20, 21 and 22, in suit, are unpatentable over the United States patent to Lacey, No. 2,302,612, in view of the United States patent to Heilbron et al., No. 2,166,213; the United States patent to Wyler, No. 2,216,867; the British patent to Heilbron et al., No. 410,814; and the French patent to I. G. Farbenindustrie Aktiengesellschaft, No. 799,901.

CONCLUSIONS OF LAW.

1. A United States patent speaks as a reference as of the filing date of the application upon which it was obtained. Whatever is disclosed in both such a patent and its application has been removed from what can be claimed by other inventors of later date than the application.

2. Plaintiff, The Sherwin-Williams Company, is not entitled to a patent containing any of claims 1, 2, 5, 6, 9, 13, 14, 17, 20, 21, and 22 of the O'Neal application in suit.

3. The complaint should be dismissed as to all the claims in suit.

Matthew F. McGuire,
Judge.

January 10, 1950.

JUDGMENT.

(Filed January 10, 1950.)

This action came on to be heard at the January term, and thereupon upon consideration thereof, it is this 10th day of January, 1950

Adjudged that the complaint be and it is hereby dismissed, with costs against plaintiffs.

Matthew F. McGuire,
Judge.

Approved as to Form:

....

Attorney for Plaintiffs.

DESIGNATION OF RECORD ON APPEAL FOR APPELLANTS-PLAINTIFFS AND STATEMENT OF POINTS UPON WHICH APPELLANTS WILL RELY.

(Filed May 17, 1950.)

Designation of Record:

Appellants-Plaintiffs' Notice of Appeal having been filed herein on February 21, 1950, the following is designated to be included in the Record for use on Appeal to the United States Circuit Court of Appeals for the District of Columbia and it is respectfully requested that the Clerk of this Court prepare a transcript thereof:

1. The Complaint.
2. The Answer.
3. Testimony of Grady M. O'Neal, commencing on page 10 of the typewritten transcript of record.
4. Printed copies of United States Patents, Nos. 2,166,213; 2,216,867; 2,302,612 (In Defendant's Exhibit 1.).
5. Findings of Fact and Conclusions of Law.
6. The Decree.
7. This designation of record and statement of points upon which Appellant will rely.
8. Please forward to the Clerk of the United States Circuit Court of Appeals for the District of Columbia, as physical exhibits, the following exhibits (or portions thereof) not listed for inclusion in the printed record on appeal:

   Plaintiffs' Exhibits 1 and 1a.

   British Patent 410,814; French Patent 799,901 (In Defendant's Exhibit 1).

Statement of Points Upon which Appellants will Rely on Appeal:

The foregoing constitutes only that portion of the record herein which bears upon the Appeal filed by the Appellants-plaintiffs and, in accordance with Rule 75(d) of the Rules of Civil Procedure, Appellants-plaintiffs submit the following as the points which will be relied upon:

(1) The District Court erred in dismissing the complaint and in not ordering the defendant to grant to plaintiffs a patent containing the claims in suit.

(2) The District Court erred in disregarding the cited portion of the patent to Lacey (Finding of Fact 4) and the improved results of the O'Neal process in suit over any of the processes of the prior art of record (Finding of Fact 2, 3, 5, 6, 7, and 8) in holding that the claims in suit are not patentable over patent to Lacey in view of the United States patents Nos. 2,166,213; 2,216,867, British Patent No. 410,814, and French Patent No. 799,901, the asserted teachings of the auxiliary references paralleling the cited teaching of the principal reference Lacey and the cited portion of Lacey categorically excluding a process such as the O'Neal Process in suit from the class of practical processes.

(3) The District Court erred in construing the teaching of the references contrary to the more specific teachings of the cited article by Linstead and Dent (Finding of Fact 5).

(4) The Court erred as a matter of fact in the translation of French Patent No. 799,901 and as a matter of law in the application of the alternative suggestion of said foreign patent as an anticipation of anything in the claims in suit.

(5) The District Court's Conclusion of Law 1 is either immaterial to the issues of this suit or an unwarranted ex-

tension of the doctrine of this Court in *Minnesota Mining & Mfg. Co. v. Coe,* 67 Apps. D. C. 256; 100 F. 2d 429.

Respectfully submitted,

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Proof of Service.

Copy of the foregoing designation of record and statement of points on Appeal served this ... day of May 1950, on the Commissioner of Patents, Washington 25, D. C.